

## CLAIMS

What is claimed is:

1. A spindle, comprising:
  - a shaft;
  - a sleeve coaxial with the shaft;
  - a first gap formed between the sleeve and the shaft for facilitating rotation therebetween;
  - a hub bound to one of the shaft and the sleeve;
  - a second gap located between the hub and the sleeve, wherein the second gap is larger than the first gap; and wherein
    - the hub is adapted to be secured to a rotor magnet which is adjacent to a stator, such that the second gap reduces magnetic flux leakage into the sleeve and a substantially negligible amount of flux crosses the first gap into the shaft.
2. The spindle of claim 1 wherein the first gap is on the order of a few microns.
3. The spindle of claim 1 wherein the shaft is stationary, the sleeve rotates relative to the shaft, and the hub is bound to the sleeve.
4. The spindle of claim 1 wherein the second gap is filled with a substantially non-permeable material.
5. The spindle of claim 1 wherein the second gap is filled with epoxy.
6. The spindle of claim 1 wherein the second gap is the range of 200 to 300 microns.

- 1 7. A precision spindle assembly, comprising in combination:  
2 a stator;  
3 a spindle hub having a rotor magnet mounted thereto that is rotatable relative  
4 to the stator; wherein the spindle hub comprises:  
5 a ferromagnetic stationary shaft;  
6 a rotatable ferromagnetic sleeve coaxial with the shaft;  
7 a fluid bearing gap formed between the sleeve and the shaft for facilitating  
8 rotation therebetween;  
9 a ferromagnetic hub bound to the sleeve;  
10 a large gap located between the hub and the sleeve, wherein the large gap is  
11 larger than the fluid bearing gap; and wherein  
12 the large gap reduces magnetic flux leakage into the sleeve such that a  
13 substantially negligible amount of flux crosses the fluid bearing gap into the shaft.
- 14 8. The precision spindle assembly of claim 7 wherein the fluid bearing gap is on  
15 the order of a few microns.
- 16 9. The precision spindle assembly of claim 7 wherein the large gap is filled with  
17 a substantially non-permeable material.
- 18 10. The precision spindle assembly of claim 7 wherein the large gap is filled with  
19 epoxy.
- 20 11. The precision spindle assembly of claim 7 wherein the large gap is the range  
21 of 200 to 300 microns.

1  
2

3  
4  
5

6  
78  
910  
20

by William Miller

After 1980

1  
2